

LONG-TERM SURVEY OF CESIUM-137 IN SOIL AND GRASS

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The construction and start-up of the Czech nuclear power plant in Temelin led to a substantial uncertainty and opposition among the Austrian population. For this reason a specific monitoring programme was started in 1992. Within this programme regularly soil, grass, precipitation, surface water, cereals, and raw milk from different locations are sampled and measured. Furthermore, in-situ gamma spectrometric measurements of grassland are conducted yearly.

This paper presents the main results from the monitoring of soil and grass. Soil and grass samples are collected from seven sites on a yearly basis. Samples from six layers (0-5 cm, 5-10 cm, ...) are taken to investigate the change of the vertical profile of the Cs-137 concentration over time.

The results show a slow decrease in Cs-137 concentration in the first layer and - depending on the soil characteristics - a more or less pronounced migration of Cs-137 to deeper layers. The calculation of the ecological half-lives of Cs-137 from the date of 1992 to 2001 yields values of 3.0 ± 0.8 years to 14.2 ± 7.5 years. A characterisation of each site with respect to the local variability of Cs-137 allows the calculation of a detection limit above which an increase in Cs-137 in the first layer is significant. Due to the Cs-137 „background“ and the local variability only an increase of more than 50 to 100 % (depending on the site) can be considered as a new deposition. Therefore, in-situ gamma spectrometry is a valuable complement to taking soil samples as it is a very sensitive tool for identifying new depositions. New depositions accumulate at the soil surface and the ‘sample volume’ is very large so the detection limits are low.

The grass samples show at all sites a strong variation in Cs-137 content. Reasons for these variations are possible different growing stage at sampling time, the varying climate and weather conditions just before sampling, and statistical variations due to the sampling procedure.